What is claimed is:

1. A wireless communication apparatus that communicates in a wireless LAN with use of time division duplex, comprising:

a modulation/demodulation circuit that, during transmission, modulates a baseband signal to an intermediate frequency signal, and, during reception, demodulates an intermediate frequency signal to a baseband signal;

a mixer circuit that is connected to an intermediate frequency circuit and a high frequency circuit, and with use of a superheterodyne method, during transmission, raises the intermediate frequency signal to a high frequency signal, and during reception, lowers a high frequency signal to the intermediate frequency signal;

the high frequency circuit of which, during transmission, an input is connected to a mixer circuit and an output is connected to an antenna circuit, and, during reception, the input is connected to the antenna circuit and the output is connected to the mixer circuit, and that, during transmission and reception, amplifies an input high frequency signal and outputs a resultant amplified signal; and an antenna circuit that emits and receives carrier waves.

2. A high frequency device that amplifies a high frequency signal to be transmitted and a received high frequency signal, in a wireless communication system in which time division duplex is used, comprising:

one high frequency amplification unit; and

a switch unit operable to switch to a transmission connection state during transmission and to a reception connection state during reception,

wherein in the transmission connection state, the switch unit connects an input of the high frequency amplification unit to an up mixer, the up mixer raising an intermediate frequency signal to a high frequency signal, and connects an output of the high frequency amplification unit to an antenna circuit, and

in the reception connection state, the switch unit connects the input of the high frequency amplification unit to the antenna circuit, and connects the output of the high frequency amplification circuit to a down mixer, the down mixer lowering a high frequency signal to an intermediate frequency signal.

3. The high frequency device of Claim 2, wherein

the switch unit includes a first switch and a second switch,

the first switch, in the transmission connection state, receiving input of a signal from the up mixer and outputting the signal to the input of the high frequency amplification unit, and, in the reception connection state, receiving input of a signal from the antenna circuit and outputting the signal to the input of the high frequency amplification unit, and

the second switch, in the transmission connection state, receiving input of a signal from the output of the high frequency amplification unit and outputting the signal to the antenna circuit, and, in the reception connection state, receiving input of a signal from the output of the high frequency amplification unit and outputting the signal to the down mixer.

4. The high frequency device of Claim 3, further comprising:

a final high frequency amplification unit provided on a transmission path via which a signal is transmitted from the second switch to the antenna circuit in the transmission connection state, and operable to amplify the signal transmitted via the path.

5. The high frequency device of Claim 3, further comprising:

one transmission/reception filter unit provided on a common section of the transmission path via which a signal is transmitted from the second switch to the antenna circuit in the transmission connection state, and a transmission path via which a signal is transmitted from the antenna circuit to the first switch in the reception connection state, and operable to attenuate, from a signal transmitted via the section, a signal of unnecessary bandwidth.

6. The high frequency device of Claim 3, further comprising:

an input signal filter unit provided on a transmission path via which a signal is transmitted from the first switch to the high frequency amplification unit, and operable to attenuate, from the signal transmitted via the transmission path, a signal of unnecessary bandwidth; and

an output signal filter unit provided on a transmission path via which a signal is transmitted from the high frequency amplification unit to the second switch, and operable to attenuate, from the signal transmitted via the transmission path, a signal of unnecessary bandwidth.

7. The high frequency device of Claim 2, wherein

the high frequency amplification unit and the switch unit are formed on one semiconductor chip.

8. The high frequency device of Claim 3, wherein

the high frequency amplification unit and the switch unit are formed on one semiconductor chip.

9. The high frequency device of Claim 4, wherein

the high frequency amplification unit, the switch unit, and the final high frequency amplification unit are formed on one semiconductor chip.

10. The high frequency device of Claim 2, wherein

the antenna circuit has a diversity function.

11. A high frequency amplification method that amplifies a high frequency signal to be transmitted and a received high frequency signal with use of a high frequency amplification device, in a wireless communication system in which time division duplex is used, the method comprising:

a connection step of, during transmission, gang connecting an input of the high frequency amplification unit to an up mixer, the up mixer raising an intermediate frequency signal to a high frequency signal, and an output of the high frequency amplification unit to an antenna circuit, and

during reception, gang connecting the input of the high frequency amplification unit to the antenna circuit, and the output of the high frequency amplification circuit to a down mixer, the down mixer lowering a high frequency signal to an intermediate frequency signal; and

an amplification step of amplifying a signal input into the high frequency device.

12. A mobile telephone that performs wireless communication in a wireless communication system in which time division duplex is used, comprising:

one high frequency amplification unit; and

a switch unit operable to switch to a transmission connection state during transmission and to a reception connection state during reception,

wherein in the transmission connection state, the switch unit connects an input of the high frequency amplification unit to an up mixer, the up mixer raising an intermediate frequency signal to a high frequency signal, and connects an output of the high frequency amplification unit to an antenna circuit, and

in the reception connection state, the switch unit connects the input of the high frequency amplification unit to the antenna circuit, and connects the output of the high frequency amplification circuit to a down mixer, the down mixer lowering a high frequency signal to an intermediate frequency signal.

13. The mobile telephone of Claim 12, wherein

the switch unit includes a first switch and a second switch,

the first switch, in the transmission connection state, receiving input of a signal from the up mixer and outputting the signal to the input of the high frequency amplification unit, and, in the reception connection state, receiving input of a signal from the antenna circuit and outputting the signal to the input of the high frequency amplification unit, and

the second switch, in the transmission connection state, receiving input of a signal from the output of the high frequency amplification unit and outputting the signal to the antenna circuit, and, in the reception connection state, receiving input of a signal from the output of the high frequency amplification unit and outputting the signal to the down mixer.

14. The mobile telephone of Claim 13, further comprising:

a final high frequency amplification unit provided on a transmission path via which a signal is transmitted from the second switch to the antenna circuit in the transmission connection state, and operable to amplify the signal transmitted via the path.

15. The mobile telephone of Claim 13, further comprising:

one transmission/reception filter unit provided on a common section of the transmission path via which a signal is transmitted from the second switch to the antenna circuit in the transmission connection state, and a transmission path via which a signal is transmitted from the antenna circuit to the first switch in the reception connection state, and operable to attenuate, from a signal transmitted via the section, a signal of unnecessary bandwidth.